

REMARKS/ARGUMENTS

Claims 33 - 44 are pending in the application. Applicant has presented method claims 33 and 43 along the lines of the previously pending method claim, claim 24, but has specifically recited a number of the additional features that appeared in claim 1, along with the recitation of the steps for carrying out the plating method.

Reconsideration and a withdrawal of the outstanding rejections is requested in view of the above claims and the following remarks.

THE CLAIM OBJECTIONS

In view of the new claims, the claim objections are believed to be moot, and the claim objections have been taken into account with regard to drafting the new claims.

THE SECTION 112 REJECTION

Applicant has considered the Examiner's rejections pursuant to section 112, first paragraph, and has addressed the rejections by incorporating the suggestions made by the Examiner in the office action in the new claims.

THE SECTION 103 REJECTION OVER COBLEY ET AL. (Method)

Claims 24-26 stands rejected under 35 USC 103(a) as being obvious over Cobley et al. (and also Gabe et al.). This rejection is respectfully but strenuously traversed and reconsideration and a withdrawal of the rejection are hereby requested.

Applicant, in new claim 33, and the claims dependent therefrom, recites a method of method for producing a bright copper coating on metal or plastic surfaces of an item to enhance the appearance of the item, the method comprising:

preparing an aqueous acidic solution containing:

- copper ions,
- at least one oxygen-containing, high molecular additive,
- an acid, and
- at least one water soluble sulfur compound,

- characterized in that the solution additionally contains at least one aromatic halogen derivative having the general formula (I).

Claim 33 includes the step of bringing the item into contact with the solution and applying a cathodic current density.

Claim 33 also includes the step of dissolving the aromatic halogen derivative in an alcohol prior to the addition of said aromatic halogen derivative to the aqueous acidic solution.

Applicant's invention, as recited in claim 33 is not disclosed or suggested by Copley et al. Copley et al. fails to disclose the presently claimed method, wherein, prior to the addition of the aromatic halogen derivative to the aqueous acidic solution, the aromatic halogen derivative is dissolved in an alcohol. Claim 33 recites this feature of the present method. The claimed subject matter is fully supported by the specification, and no new matter has been introduced. Applicant's specification recites that the

aromatic halogen derivatives are dissolved in alcohols before they are added to the solution.

[0054] Before use the aromatic halogen, derivatives are preferably dissolved in methanol or in other alcohols (e.g., glycol) or polyalcohols (e.g., polyethylene glycol) and then added to the solution of the invention. To dissolve the aromatic halogen derivatives in the solution of the invention, it is often helpful to alkalinize the solution, certain amounts of salts that are readily soluble in water such as alkali halogen phenolates forming in the process. A bisulfite adduct forming with the CO-group of the aldehyde radical may also be used to improve water solubility with, possibly, partial formation of α -hydroxysulfonates. Partial acetal formation may also occur if aldehyde-containing aromatic halogen derivatives are dissolved in alcohol.

(Applicant's substitute specification [0054])

In addition, Applicant discloses other features of the present method in the dependent claims. Claim 34 includes an alkalinizing step to promote the coating process by promoting the dissolving of the aromatic halogen derivative. Claim 34 recites alkalinizing the aqueous acidic solution to promote the dissolving of the said aromatic halogen derivative in said aqueous acidic solution.

Claim 35 further particularizes the alkalinizing step of claim 34, by reciting that alkalinizing said aqueous acidic solution includes forming alkali halogen phenolates by adding water soluble salts to said solution.

Claim 36 includes a further feature of the present coating method which involves improving the solubility of the aromatic halogen derivatives. Claim 36 recites improving the water solubility of said aromatic halogen derivatives by forming a bisulfite adduct with the CO group of the aldehyde radical.

Claim 37 further defines the inventive coating method by reciting that improving the water solubility of the aromatic halogen derivative comprises partial formation of α -hydroxysulfonates.

The present invention, as set forth in claim 33, and the claims depending therefrom, recites a method that is neither disclosed nor suggested by Cobley et al. Applicant's method involves the dissolving of the aromatic halogen, which, in the present method, takes place before the aromatic halogen is added to the solution. This step is distinguishable from Cobley et al. which describes a component of a bath, not a separate dissolving step.

Cobley et al., unlike the present invention, fails to disclose the prior dissolving of the aromatic halogen derivatives in alcohol before they are added to the solution.

For these reasons, the present invention, as recited in claim 33, and the claims dependent therefrom, should be patentable over Cobley et al.

In addition, the additional dependent claims recite further features that Cobley et al. fails to disclose or suggest. Claim 38 recites a coating method using a solution where the concentration of the at least one aromatic halogen derivative having the formula (I) ranges from 0.005 to 0.5 mg/l, and includes the distinguishing features recited in claim 33 from which claim 38 depends. Applicant's method recited in claim 38 also uses a much lower concentration of halogen derivative, than the Cobley et al. consumption inhibiting aldehyde compounds. The present method, recited in claim 38, for these reasons, and for the above reasons, should be patentable over Cobley et al.

Claim 39 recites a method of coating an item using an aqueous acidic solution containing copper ions that has copper ions present in a copper containing compound that is present in the solution in an amount from 160,000 to 400,000 times the amount of said at least one aromatic halogen derivative. This claim is fully supported by the specification and no new matter has been introduced (see pp. 19-20 of the substitute specification Example 2a, and see p. 18, Example 1b). The method involves the use of a relatively smaller amount of the aromatic halogen compound compared with the amount of copper ions to provide a coating method for an amount of copper ions that greatly exceeds by hundreds of thousands of times, the amount of the aromatic halogen compound.

In addition, new claim 43 recites a method that includes the step of prior to the addition of the aromatic halogen derivative to said aqueous acidic solution, the aromatic halogen derivative is dissolved in an alcohol, and, in addition, recites the concentration of the at least one aromatic halogen derivative having the formula (I) is less than 1.0 mg/L and is not any one of 2-chloro-4-hydroxybenzaldehyde, 4-chlororesorcinol and 3-chlorophenol.

Claim 43 should be patentable over the cited art.

Claim 44 depends from claim 43 and recites that the aromatic halogen derivative having the formula (I) ranges from 0.005 to 0.9 mg/l.

Accordingly, Cobley et al. does not disclose or suggest the present invention, as recited in the pending claims.

THE SECTION 103 REJECTION OVER GABE ET AL. (Method)

The claimed matter has been separately rejected under Gabe et al. Applicant submits that new claims 33-44 also should be patentable over Gabe et. al for the same reasons set forth above distinguishing the invention over Cobley et al.

Applicant previously pointed out that both Cobley et al. and Gabe et al. teach a plating bath composition containing aldehydes or alcohols, respectively, to inhibit consumption of additives added to metal plating baths in order to improve metal deposition on a substrate, at concentrations higher than the present invention.

Gabe et al. discloses alcohols to inhibit additive consumption:

alcohols of the present invention are believed to inhibit additive consumption by one or a combination of the following mechanisms. Many additives break down or decompose at the anode to oxidation products. The alcohols of the present invention may competitively adsorb onto an anode over additives, and become oxidized in place of the additives. Many metal plating baths contain chloride. Chloride is often added to metal plating baths in the form of HCl. Chloride is oxidized at the anode to chlorine. Chlorine may then oxidize the bath additives reducing the effectiveness of the additives in the metal plating bath. By adding one or more alcohols to the metal plating bath, chlorine oxidizes the one or more alcohols over the additives. In other words, the alcohols may perform as sacrificial species. In another proposed mechanism, the alcohols may compete with chloride, or with both chloride and the additives at the anode surface. Thus, the alcohols are oxidized at the anode over the chloride, or both the chloride and the additives.

(Gabe et al., at col. 8, line 57 – col. 9, line 8)

Gabe does not disclose the present method, including the step claimed by Applicant of dissolving the aromatic halogen derivative in an alcohol prior to the addition of said aromatic halogen derivative to the aqueous acidic solution.

Gabe discusses, at pars. [0046] and [0047] adding alcohols, but does not disclose the steps of the present invention, including Applicant's step of dissolving the aromatic halogen derivative in alcohol prior to the addition of the aromatic halogen derivative to the aqueous acidic solution. The only specific mention made by Gabe is in par. [0047] which states that one method is to mix the alcohols into the bath with the other bath components and additives.

In addition, Gabe et al. provides examples (see Examples 2 and 3) wherein the copper is present in a much greater amount relative to the suppressor compound of Gabe et al. Gabe discusses that each compound was added at 0.1 g/L, which is 100mg/L. So although the position in the Office Action relies on Gabe et al. for a broad range of "about 1 mg/L" (citing to p. 5, [0046] of Gabe et l.), the Examples indicate that the amount of the suppressor used is 100mg/L relative to the copper amount (of 80g/L), is therefore much greater than the present invention. This is also in an example where the copper is present in an amount of 80g/L. New claim 39 specifically recites that the copper ions are present in a copper containing compound that is present in said solution in an amount from 160,000 to 400,000 times the amount of said at least one aromatic halogen derivative. Gabe et al. fails to disclose or suggest the present invention recited in the claims, and, when claim 39 is considered, the method considering the ratio amounts is not disclosed or taught by Gabe et al.

For the above reasons, the new claims distinguish the invention over the cited references, and reconsideration and a withdrawal of the rejections is respectfully requested.

The remaining rejections of the claims, including the rejections applying the Todt reference, are believed to be moot in view of the new claims presented, and furthermore, for the same reasons as those set forth above, are believed to be overcome by the claims.

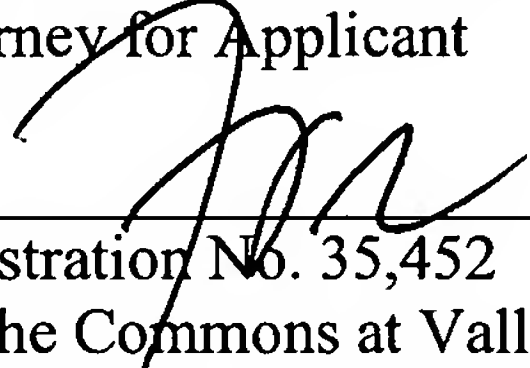
In the event that issues remain, the Examiner is invited to telephone the Applicant's undersigned representative to resolve them.

If necessary, an appropriate extension of time to respond is respectfully requested. This reference is referred to in the Office Action.

The Commissioner is authorized to charge any additional fees which may be required to Patent Office Deposit Account No. 05-0208.

Early action on the case and examination of the pending claims is hereby earnestly solicited.

Respectfully submitted,
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